

Calculating Proportion of Different Classes within Multiple Polygons in ArcView 3.2

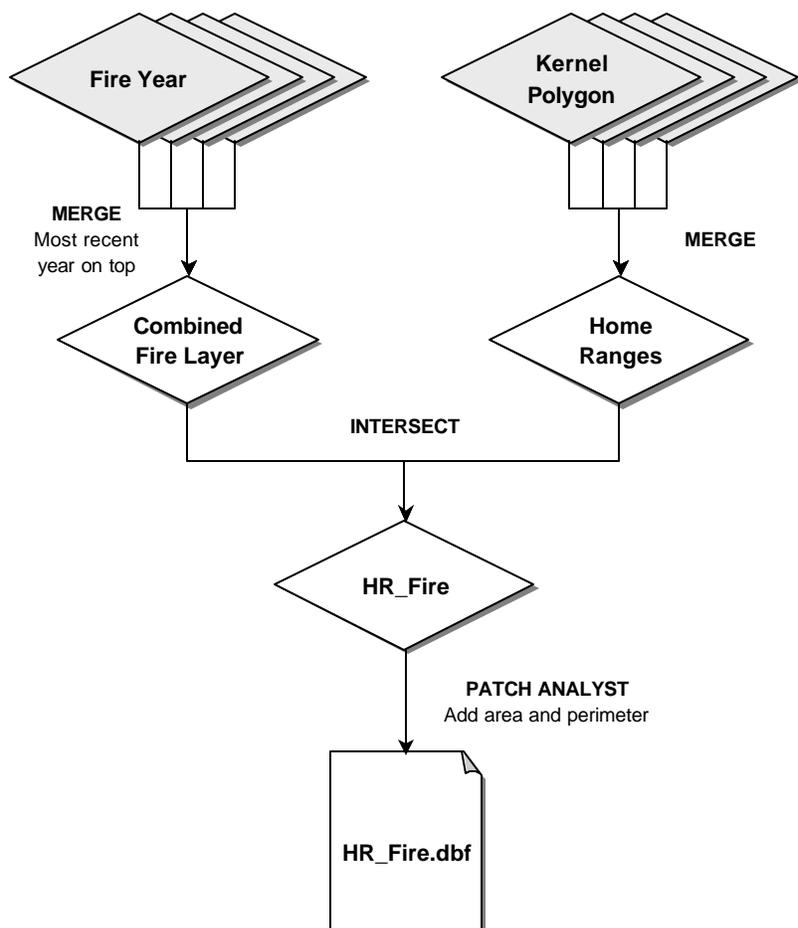
This instruction set shows you how to calculate how much of each home range polygon is made up of each fire age class. In the example given here, kernel home range polygons and multi-date fire polygon coverages are the original data themes provided for the intersection and areal calculation to answer the following question:

What proportion of each home range polygon is made up of different age classes of habitat (based on fire year)?

The cartographic model depicts the previous GIS functions (in light gray) performed to obtain the combined fire and home range layers.

These instructions may be adapted for any application where you need to find out the area of polygons where themes intersect, but apply specifically to obtaining the proportion of burn areas within home range polygons. The following is meant to guide you through the five-step process of obtaining the area, using ArcView and the appropriate extensions:

- A. Overlay/merge all fire layers (most recent on top) and overlay/merge all home range polygons – *previously completed*
- B. Overlay/intersect merged fire layers with home range polygons
- C. Add area and perimeter (or calculate more spatial statistics using Patch Analyst)
- D. Export table as .dbf to do calculations in Excel



It is assumed that you are already familiar with basic GIS functions in ArcView and that you have already assembled your combined fire and home range layers.

The example file names used here are:

ORIGINAL DATA THEMES

Allfiresupto2001.shp a polygon shapefile containing the merged fire year layers

All_season1_lscvkernel.shp a shapefile containing the intersected home range kernel polygons for season 1

CREATED DATA THEMES

Fire_HR.shp a polygon shapefile resulting from the intersection of Allfiresupto2001.shp and All_season1_lscvkernel.shp

A. Overlay/Merge All Fire Layers (most recent on top) and Overlay/Merge All Home Range Polygons – previously completed using the Geoprocessing Wizard

It is assumed that you have already assembled your combined fire and home range layers. See Part B for a reminder on how the Geoprocessing Wizard works.

1. Establish your ArcView project (i.e. add the required data themes to a View, set the map and distance units in View Properties, etc.)
2. Choose FILE → EXTENSIONS and add the following extensions:
Geoprocessing Wizard
Patch Analyst

B. Overlay/Intersect Merged Fire Layers with Home Range Polygons

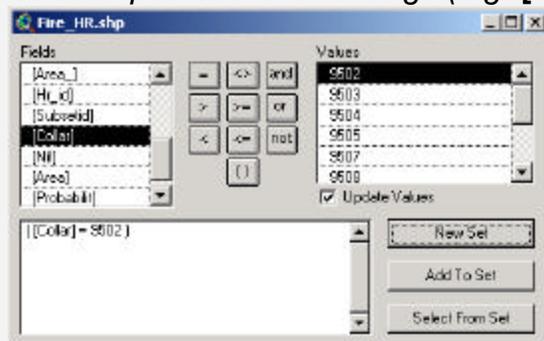
1. Choose VIEW → GEOPROCESSING WIZARD...
2. Select Intersect two themes; Click Next
3. Select **Allfiresupto2001.shp** as the input theme and **All_season1_lscvkernel.shp** as the overlay theme
4. Click OK
5. Specify a directory and name for the new polygon theme that will be generated (e.g. **Fire_HR.shp**); Click Finish

C. Add Area and Perimeter (or Calculate More Spatial Statistics Using Patch Analyst)

1. Make **Fire_HR.shp** the active theme
2. Choose PATCH → ADD AREA AND PERIMETER...
3. Open the theme's table to view the added **Area_** field

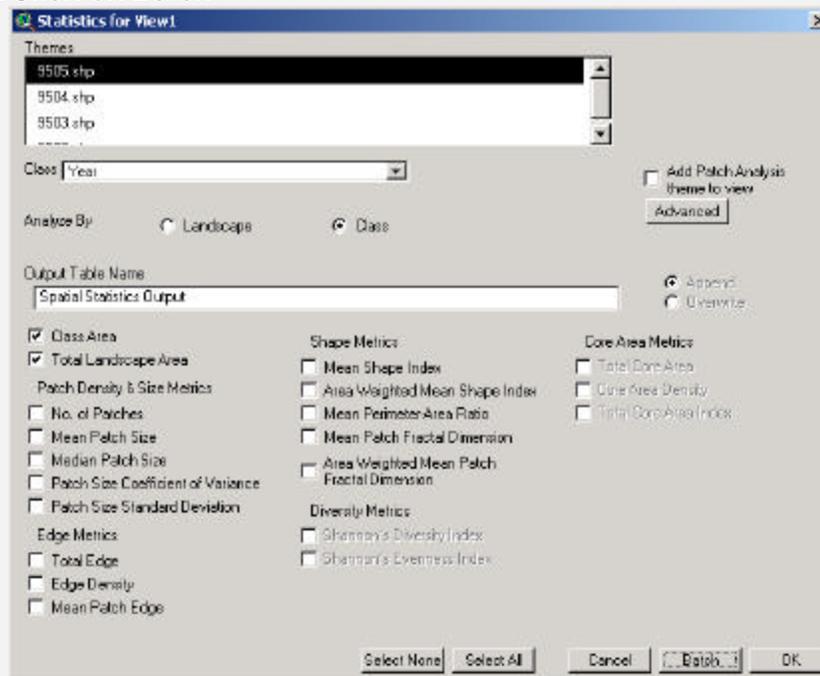
Alternatively, you may have Patch Analyst calculate many different spatial metrics. To automate this, you will first need to create separate shapefiles for each home range.

1. Make **Fire_HR.shp** the active theme
2. Choose THEME → QUERY...
3. Select a particular home range (e.g. **[Collar = 9502]**)



4. Choose THEME → CONVERT TO SHAPEFILE...
5. Give this new theme a name (e.g. **9502_season1.shp**)
6. Repeat 1 through 4 for all home range collar values until you have all your home ranges in separate themes
7. Choose THEME → CLEAR SELECTED FETAURES
8. Make ALL the newly created themes active
9. Choose PATCH → SPATIAL STATISTICS
10. Highlight one of the Themes in the first box
11. Select Field = "Year"
12. Click on "Class" (and/or Landscape)
13. Select only the metrics you want calculated (e.g. CA, TLA)

14. Click on Batch



15. Repeat 8 through 12 until you have added all the themes

16. Click Cancel

17. Select Scripts from the Project Window and run the Batchscript

D. Export Table as .dbf to do Calculations in Excel

1. Make the Spatial Statistics Output Table active
2. Choose FILE → EXPORT...
3. Select your preferred export format (dBASE, INFO table, Delimited Text)
4. In the next menu assign a directory and name for the table file that will be generated; Click OK

Bring this file into Excel (or other statistical software package) where you can calculate the percentage of burn class each home range e.g. $\text{Area}_m / \text{Area} \times 100\%$, where Area_m is the added area from Patch Analyst and Area is the original area of the home range kernel

Note: If you did not combine the Alberta boundary polygon with your merged fire layer, then remember to sum the fire classes for each home range and subtract this number from the total area of the home range polygon to obtain the unburned area.

e.g. **Unburned = $\text{Area}_m - S \text{Area}_{mn}$**

where m denotes the particular collar and n denotes the fire year class.